# Sensitivity of Spacebased Microwave Radiometer Observations to Ocean Surface Evaporation

W. Timothy LIU and Li LI
Jet Propulsion Laboratory 300-323, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109-8099, U.S.A.
Tel.:818-354-2394; Fax:818-393-6720; Email:liu@pacific.jpl.nasa.gov

(Preferences: Topics-C2; Presentation-Oral)

Ocean surface evaporation and the latent heat it carries are the major components of the hydrologic and thermal forcing on the global oceans. However, there is practically no direct in situ measurements. Evaporation estimated from bulk parameterization methods depends on the quality and distribution of volunteer-ship reports which are far less than satisfactory. The only way to monitor evaporation with sufficient temporal and spatial resolutions to study global environment changes is by spaceborne sensors.

The estimation of seasonal-to-interannual variation of ocean evaporation, using spacebased measurements of wind speed, sea surface temperature (SST), and integrated water vapor, through bulk parameterization method,s was achieved with reasonable success over most of the global ocean, in the past decade. Because all the three geophysical parameters can be retrieved from the radiance at the frequencies measured by the Scanning Multichannel Microwave Radiometer (SMMR) on Nimbus-7, the feasibility of retrieving evaporation directly from the measured radiance was suggested and demonstrated using coincident brightness temperatures observed by SMMR and latent heat flux computed from ship data, in the monthly time scale. However, the operational microwave radiometers that followed SMMR, the Special Sensor Microwave / Imager (SSM/I), lack the low frequency channels which are sensitive to SST. This low frequency channels are again included in the microwave imager (TMI) of the recently launched Tropical Rain Measuring Mission (TRMM).

The radiance at the frequencies observed by both TMI and SSM/I were simulated through an atmospheric radiative transfer model using ocean surface parameters and atmospheric temperature and humidity profiles produced by the reanalysis of the European Center for Medium Range Weather Forecast (ECMWF). From the same ECMWF data set, coincident evaporation is computed using a surface layer turbulent transfer model. The sensitivity of the radiance to evaporation over various seasons and geographic locations are examined. The microwave frequencies with radiance that are significant correlated with evaporation are identify and capability of estimating evaporation directly from TMI will be discussed.